

**ADOPTION OF ENERGY EFFICIENCY STRATEGIES IN THE DESIGN OF  
A HIGH-RISE OFFICE BUILDING IN LAGOS, NIGERIA**

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**SEPTEMBER, 2021.**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE  
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THE AWARD OF MASTER OF SCIENCE (M.Sc.) DEGREE IN  
ARCHITECTURE, COVENANT UNIVERSITY.**

**SEPTEMBER, 2021.**

## **ACCEPTANCE**

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of degree of Master of Sciences in the department of Architecture, College of Science and technology, Covenant University, Ota, Nigeria.

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## **DECLARATION**

I, **MAHA, SOMTOCHUKWU AZUKA (15CA03352)** declares that this thesis was carried out by me under the supervision of Dr. Isidore C. Ezema, of the Department of Architecture, College of Science and Technology, Covenant University, Ota, Nigeria. I attest that the dissertation has not been presented, either wholly or partly, for any degree elsewhere before. All sources of data and scholarly information used in the thesis were duly acknowledged.

**MAHA, SOMTOCHUKWU AZUKA**

**Signature & Date**

## CERTIFICATION

We certify that this dissertation titled “**ADOPTION OF ENERGY EFFICIENCY STRATEGIES IN THE DESIGN OF A HIGH-RISE OFFICE BUILDING IN LAGOS, NIGERIA**” is an original research work carried out by MAHA SOMTOCHUKWU AZUKA (15CA03352) in the Department of Architecture, College of Science and technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of Dr. I. C. Ezema. We have examined and found this work acceptable as part of the requirements for the award of Master of Science in Architecture.

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## **DEDICATION**

This thesis is dedicated to God, who has provided so much more than I have deserved, my family for being with me at my highest and lowest moments, my friends who have caused me to laugh and smile even in the most uncomfortable situations.

This is dedicated to all the lecturers I had the opportunity to be taught and mentored by, all the students and alumni of the Covenant University's department of Architecture. My fellow Society of Architecture Student (SAS) executives, I genuinely appreciate the opportunity you all gave me to lead our wonderful team for two years. This thesis is dedicated to everyone who wakes up every day with goals and targets. I pray you achieve all you set out to do and much more.

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## **ABSTRACT**

Energy Efficiency is the use of less energy to carry out the same activity hereby ensuring that energy waste is avoided hereby reducing the demand for energy. Energy Efficiency is a method of achieving eco-friendly design as it reduces greenhouse gas emissions while saving money and reducing the overall life-cycle cost of the building. Energy Efficiency is typically achieved by the adoption of more technological manufacturing processes in the design of materials, equipment or appliances that ensure the reduction of energy use or demand or by using widely accepted strategies for reducing energy loss or wastage. With Lagos being the most populated state in Nigeria, and being the economic centre of the country, it hosts the most amount of commercial and administrative activities in the nation and inadequate power supply being a norm in the nation. High-rise buildings consume more energy than low or medium rise buildings, the adoption of Energy Efficiency is highly important in the design of a High-Rise office building so as to reduce the long term operational costs on power as well as providing a sustainable and environmentally friendly solution to the power issues faced in the nation. This study investigated the adoption levels of Energy Efficiency strategies by Architects in Lagos Nigeria, through the use of Google forms in distributing questionnaires as well as the adoption levels of Energy Efficiency strategies in existing High-Rise office buildings in Lagos Nigeria achieved by carrying out case-studies on selected High-Rise office buildings. The findings of this research are that Architects within the study area have knowledge on the identified energy efficiency strategies in literature, but the received questionnaires indicate that the client's budget is the largest factor that affects the adoption of the energy efficiency in their building designs.

**Keywords: energy efficiency, high-rise, office building, high-rise office building**

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the Study**

An office is a building where organizations carry out administrative tasks to achieve or support the goals, aims and objectives of the organisations. An office, when referring to the physical location, is the place where an organisation makes its managerial decisions and records all transactions as well as activities. The office is the physical representation of the brains or leadership of an organisation.

Buildings, in all of human history, have had an important role to play in the human society (Simons, Robinson & Lee 2014). An office is widely known as to be a room or space where the administrative tasks of an organisation are carried out. An office is a space that refers to an individual's location of duty, (Long, 2004). When it is used as an adjective, the terminology "office" might refer to transactional tasks, while used while writing in legal terms, an organisation has offices as physical representations of the organisation's operational presence, regardless of the tasks being performed there are administrative or operational, (Akhimien, Adamolekun, & Isiwele, 2017).

Office buildings over time have become highly recognizable and iconic buildings that stand out and define the skylines of various cities in all continents, indicating the economic and technological development of the city (Akhimien, Adamolekun, & Isiwele, 2017). Office buildings include a vast number of structures which play important roles in the economic development and financial growth of urban centres, (Duffy, 1997). These include any building typology between a two-story building and a high-rise building with over a hundred floors.